Marina Maintenance and Operation

Environmental Concerns

Land management decisions, operating procedures, and structural improvements may all contribute to—or detract from—the quality of the land and water surrounding your marina. Roads and parking areas may convey stormwater directly into adjacent waterways. Dredging may re-suspend toxic compounds such as heavy metals, hydrocarbons, and synthetic chemicals. Hazardous chemicals may be leached into the water from piers and other similar structures. And, the installation of lakeside and in-water structures may lead to accelerated coastal erosion and sedimentation that can bury bottom-dwelling organisms, block sunlight, and clog fish gills.

The final design of a marina should be a compromise of marina capacity, services, and access, while minimizing environmental impacts, dredging requirements, protective structures, and other site-development costs. When marinas are designed with consideration of land and water quality in mind, they can be an asset instead of a detriment to the ecosystem.

Laws and Permits

Marina Construction and Dredging

The Clean Water Act sets standards for the discharge of dredge or fill materials into navigable waters, including wetlands. Under Section 404 of the act (33 U.S.C. 1344), the majority of marina development and expansion projects along the Great Lakes, including dredging, will require a joint permit from the U.S. Army Corps of Engineers (USACE), the Illinois Department of Natural Resources (IDNR), and the Illinois Environmental Protection Agency (IEPA). In addition, 17 IAC 3704 requires a permit from IDNR for construction projects in any public body of water. More information on dredging permits can be found at www.dnr.illinois.gov/WaterResources/Pages/Permit%20Programs.aspx.

Before a Section 404 permit can be issued, IEPA must certify that the proposed project is in compliance with the state's water quality standards (33 USC 1341). For individual permits, certification occurs during the application review. In order for nationwide permits and other general permits issued by USACE to be valid in Illinois, IEPA must have already certified that the activities they permit will meet water quality standards. Applications that fail to meet water quality standards can be denied even if the proposed activity complies with all other Section 404 provisions. For additional information on the certification program, call the IEPA Watershed Management Section at (217) 782-3362.

Sediment testing is not required for every dredging project. However, in some cases, IEPA may require sediment sampling prior to dredging to determine the appropriate disposal options (35 IAC 395.203). It is strongly recommend that you contact IEPA early to see what is required. If required, sediment testing data needs to be submitted with the permit applications.

Endangered Species Assessment

The Endangered Species Act (33 U.S.C. 1251-1376) protects species that are in danger of extinction throughout all or a significant portion of their range. Under this act, a biological assessment is required to determine if endangered species are present before construction activities may begin.

Fish and Wildlife Impact Review

The Fish and Wildlife Coordination Act (16 U.S.C. 661) provides authority for the U.S. Fish and Wildlife Service (USFWS) to review impacts to fish and wildlife from activities that require a USACE permit, such as dredging.

Pesticide Application

Part of the National Pollutant Discharge Elimination System (NPDES), Illinois created the General NPDES Permit for Pesticide Application Point Source Discharge in 2011. Marinas are required to have this permit if they use biological or chemical pesticides on the water or along the shoreline to manage plants, insects, or animals (35 IAC 309). Marinas can either acquire this permit for themselves or contract with a permitted commercial pesticide applicator. Eligibility and application requirements can be found at www.epa.state.il.us/water/permits/pesticide/general-permit.pdf.

As a condition of the General Permit for Pesticide Application, marinas that apply pesticides to more than 80 acres of water surface area or 20 linear miles of shoreline annually must develop and implement a Pesticide Discharge Management Plan. Visit www.epa.state.il.us/water/permits/pesticide/pdmp.html for more information.

Best Management Practices for Marina Facilities and Structures

Use Upland and Inland Areas

- ✓ Locate buildings, workshops, and waste storage facilities in upland areas, away from fragile shore-side ecosystems, whenever possible. Upland areas also provide a measure of protection against floods.
- ✓ Locate parking and vessel storage areas away from the

water, where feasible, and provide infiltration greenbelts between these areas and the water.

- ✓ Consider inland areas for boat repair activities and winter storage. Use hydraulic trailers to quickly and easily move boats to inland storage locations.

Limit Shaded Areas over the Water

- ✓ Limit the number of covered slips in order to provide nearshore bottom-dwelling organisms with as much sunlight as possible.
- ✓ Choose docking systems that minimize light blockage.

Minimize the Need for Dredging

- ✓ Design new marinas so that deep water can be reached with minimum excavation, filling, and dredging.
- ✓ Consider options to increase circulation or reduce sediment accumulation if your marina requires maintenance dredging more frequently than once every four years. Possibilities include:
  - Extending piers and docks into naturally deep waters.
  - Locating slips for deep draft boats in naturally deep water.
  - Dredging channels to follow the course of the natural channel.
  - Providing dry storage for smaller boats.

Employ Nonstructural Shore Erosion Control Measures

- ✓ Use nonstructural measures that encourage the preservation of the natural environment, such as beach nourishment, wetlands creation, and shoreline plantings, to manage shore erosion.
- ✓ Use revetments or breakwaters to stabilize and ensure the long-term viability of nonstructural controls when they are not sufficient to control erosion alone.
- ✓ Build structural controls as a last resort and in this order of preference: shoreline revetments, breakwaters, and bulkheads.
- ✓ Minimize the adverse effects of erosion control projects on adjacent properties, navigation, threatened or endangered species, and significant historic or archaeological resources.
- ✓ Post “no wake” signs to indicate areas with sensitive shorelines.

Minimize Impervious Areas

- ✓ Keep paved areas to an absolute minimum.
- ✓ Use pervious pavers or porous pavement where pavement is needed.
- ✓ Maintain vegetated buffers, such as rain gardens, trees and shrubs, or grasses, between all impervious surfaces and the water. Properly constructed rain gardens and woody vegetation are more effective than turf grass in absorbing runoff and pollutants.
- ✓ Check with local authorities to ensure compliance with local zoning ordinances.

Implement a Light Reduction Plan

- ✓ Become familiar with and adhere to local building and development codes related to light pollution.
- ✓ Follow LEED standards. Visit new.usgbc.org/leed for more information.
- ✓ Minimize site lighting wherever possible.
- ✓ Define the project boundary and consult with a lighting engineer when determining where to place luminaries to ensure that light trespass is controlled.
- ✓ Minimize light trespass using technologies that restrict light to where it is needed, such as full cutoff luminaries, low-reflectance surfaces, and low-angle spotlights.
- ✓ Install timers, occupancy sensors, or other controls to extinguish light when not needed.
- ✓ Replace incandescent bulbs with LED or fluorescent bulbs. These produce the same amount of light output for less energy.
- ✓ Train marina employees and boaters to use lighting systems efficiently.

Build Dry-Stack Storage

- ✓ Consider expanding storage capacity by adding covered dry-stack storage rather than wet slips. Dry-stacked boats:
  - Do not accumulate marine growth, making antifouling unnecessary and the associated need to wash, scrape, and paint minimal
  - Are less likely to accumulate water in their bilges and, therefore, discharge oily bilge water
  - Require less weathering and maintenance
  - Allow for greater public access to waterways and an increased number of rental units

- ✓ Manage stormwater runoff from dry-stack areas and any expanded parking areas to reduce the flow of runoff and prevent pollutants from entering the water.
- ✓ Use absorbent booms to collect any grease or oil in the launching and retrieval areas for the dry-stack building.
- ✓ Plan for accidental spills and possible fires in dry-stack storage facilities, which concentrate boats in a relatively small area. See the Safety and Emergency Preparedness chapter for more information.

Conserve Water at Facilities

- ✓ Equip all freshwater hoses with automatic shutoff nozzles.
- ✓ Fix any leaks and drips from dockside faucets or hoses.
- ✓ Install low-flow faucets, toilets, and shower heads.
- ✓ Install automatic faucets and toilet fixtures.

Meet Recycling Collection Needs

- ✓ Provide recycling containers for waste materials banned from landfill disposal or incineration, including lead acid batteries, waste oil, used oil filters, and electronic waste (415 ILCS 5).
- ✓ Anticipate need for collection bins and pick-up services when designing new marinas.

Maintain Structures Using Clean Marina Practices

- ✓ Scrape, sand, and paint land-side structures according to the same management principles used for vessels. See the Vessel Maintenance and Repair chapter for more information.
- ✓ Move floating structures to shore for scraping, painting, and major repairs, if possible.

Best Management Practices for Protecting Habitats

Conserve Sensitive Land

- ✓ Preserve natural habitats whenever possible.
- ✓ Minimize disturbance to native vegetation in areas along the banks of rivers, streams, lakes, ponds, reservoirs, and wetlands.
- ✓ Consider how changes to the shoreline will affect wildlife before making any changes.
- ✓ Minimize the use of riprap where possible and maintain

native vegetation along shorelines. If structural shoreline protection must be used, use riprap revetments instead of vertical bulkhead walls (concrete or steel sheet pile) as much as possible.

- ✓ Discourage unnecessary idling. Emissions can be harmful to the surrounding habitats and contribute to climate change.
- ✓ Provide a serene setting for your marina by placing adjacent sensitive land in a conservation trust. Income, estate, and property tax benefits may be available.
- ✓ Participate in programs to preserve farmland, forestland, waterfront, wetlands, rare or unique areas, scenic areas, endangered species habitats, historic properties, and open spaces.
- ✓ Sell or donate the land, or the development rights, to a local land trust or a non-profit organization.

Minimize the Impacts of Dredging

Dredging has the potential to reduce fish spawning and threaten juvenile fish survival due to the removal of bottom substrates and resulting high levels of suspended silt. Currents can also move silt particles suspended during dredging away from the site and deposit them in other spawning or juvenile fish habitats.

- ✓ Contact and work with the IEPA Bureau of Water to ensure that dredging projects have minimal impact on the environment and are in line with state laws.
- ✓ Do not dredge during critical migration or spawning periods of important species of fish and wildlife. Contact IDNR to learn when these periods are.
- ✓ Avoid colonial waterbird nesting areas and historic waterfowl staging and concentration areas.
- ✓ Ensure that your dredging contractor selects an appropriate disposal site and containment design for the sediment. The disposal site must have minimal impact on public safety, adjacent properties, and the environment. Dredge material must be disposed of in accordance with 35 IAC 807-810.
- ✓ Use dredging methods that minimize environmental impacts, like hydraulic dredging.

Practice Water Conservation Landscaping

- ✓ Replace lawn areas with wildflowers, groundcover, shrubs, and trees.

- ✓ Select plants that are suited to the existing soil type, moisture, and sunlight. These types of plants will require minimal water, fertilizer, and pesticides.
- ✓ Select perennial plants instead of annuals. Perennial plants only need to be planted once and tend to shade out most weeds. Consult with University of Illinois Extension or local nurseries for advice on selecting the right plants.
- ✓ Place mulch (wood chips, bark, grass clippings, nut shells, etc.) to a depth of 3-4 inches around plants and at the base of trees to keep water in the soil, prevent weeds, and reduce the amount of soil picked up by stormwater.
- ✓ Group plants with similar water needs together. This practice will ease your maintenance burden, conserve water, and benefit the plants.
- ✓ Water only when shrubs wilt and grass lies flat and shows footprints.
- ✓ Water in the early morning or early evening when temperatures generally are cooler to minimize water loss due to evaporation.
- ✓ Water deeply and infrequently. Deep watering promotes stronger root systems that enable plants to draw on subsurface water during hot spells and droughts.
- ✓ Select equipment that is appropriate for your watering needs. Sprinklers work well for lawns. Soaker hoses or drip irrigation systems deliver water directly to the roots of shrubs, flowers, and vegetable plants with minimal loss from evaporation.
- ✓ Collect rainwater by directing downspouts into covered containers, such as commercially-available rain barrels or cisterns. Use the collected water on your landscaped areas.
- ✓ Recycle graywater—wastewater from activities like dishwashing and bathing that does not contain sewage or chemicals. Graywater can be filtered and used to water landscaped areas, but it must be conveyed in a plumbing system separate from potable water. Check local ordinances for permit requirements and obtain written approval before pursuing this option.

Adopt Integrated Pest Management Practices

Integrated pest management is an ecological approach to pest control. It integrates cultural, mechanical, biological, and, as a last resort, chemical control methods while minimizing effects on non-target species and wildlife. See lawntogreatlakes.org for more information on green lawn care.

- ✓ Select native plants that are disease and insect resistant, will out-compete common weeds, and are adapted to your geography and soil conditions. Consider the degree of sun/shade exposure, slope, drainage, wind, volume of foot traffic, soil type, temperature variations, and other environmental factors. For information on Illinois native plants, visit www.il.nrcs.usda.gov/technical/plants/npg/.
- ✓ Rotate plants periodically to disrupt the life cycle of pests.
- ✓ Mow when grass reaches 3-4 inches. Set your mower to cut at 2-2 1/2 inches in height and avoid cutting more than a third of the height.
- ✓ Use mulches to reduce weed problems, conserve moisture, and prevent soil erosion.
- ✓ Tolerate weeds and other pests that are not harmful.
- ✓ Foster natural predators such as spiders, praying mantises, dragonflies, lacewings, soldier beetles, birds, bats, frogs, lizards, toads, and certain snakes.
- ✓ Use natural agents such as *Bacillus thuringiensis* (BT) or inorganic insecticides that kill pests on contact and pose little threat to the environment. Check the label to be sure that the natural agents are approved for use in aquatic systems.
- ✓ Pull weeds by hand instead of relying on herbicides.
- ✓ Use pesticides only after all other options have been exhausted. An IEPA permit is required to apply pesticides to aquatic plants. More information on permit requirements can be found at www.epa.state.il.us/water/permits/pesticide/index.html.
- ✓ Apply pesticides directly to problem areas. Select pesticides that are designed to kill only the insect, weed, or disease organism that is causing the problem.
- ✓ Treat only serious or intolerable pest infestations and purchase the least toxic chemical in the smallest amount practical.
- ✓ Do not use pesticides just before it rains or on a windy day.

- ✓ Apply insecticides during the evening, when honeybees and other beneficial insects are less active.

Help Control the Spread of Aquatic Invasive Species

Biologists estimate that more than 180 aquatic invasive species (AIS) now inhabit the Great Lakes region, causing billions of dollars of economic damage and significant ecological change. Invading species—such as zebra and quagga mussels, round goby, and Eurasian water milfoil—have displaced native species, drastically altered aquatic ecosystems, and interfered with business and recreational activities. Because invasive species are virtually impossible to eliminate, preventing new introductions is essential. Boats and equipment can transport invasive species, and unwanted bait dumped by sport anglers can become invaders. Encouraging best management practices at your marina can help limit the spread of AIS to other water bodies.

Training and Facilities

- ✓ Become familiar with the invasive species in Illinois. For a list of species, visit www.dnr.illinois.gov/adrules/documents/17-805.pdf.
- ✓ Train marina personnel and boaters to identify AIS. For identification resources, access the Great Lakes Aquatic Nonindigenous Species Information System through www.glerl.noaa.gov.
- ✓ Encourage anglers to use non-invasive or native species as bait.
- ✓ Train marina personnel and boaters on procedures for washing the exterior and interior surfaces of boats. Refer to the section below for a list of procedures.
- ✓ Consider providing pressure washing stations—either fixed or portable—or a boat decontamination unit.
- ✓ Consider dedicating parking area for boaters to inspect and clean boats.
- ✓ Prohibit personnel and customers from dumping removed species into the water (17 IAC 805.30).
- ✓ Remind personnel and boaters that it is illegal in Illinois to drive on public roads with aquatic plants or animals attached to a boat or trailer (625 ILCS 45/5/23).
- ✓ Post signs reminding boaters of steps to take before retrieving or launching boats. Visit iiseagrant.org/catalog/ais/SAH_launch.html to order a Stop Aquatic Hitchhikers sign.
- ✓ Distribute the AIS Clean Boater Tip Sheet included at the

end of this guidebook.

- ✓ Include best practices and laws with renewal fee orders and other yearly mailings.
- ✓ Instruct boaters to contact marina personnel if they believe they have identified an invasive species.
- ✓ Report new infestations to USFWS at (877) 786-7267.
- ✓ Train marina personnel on the Stop Aquatic Hitchhikers Clean Boats Crew program. Visit www.iiseagrant.org/ais/cleanboats.html for more information.
- ✓ Participate in the Hydrilla early detection and rapid response program. More information about the program and instructions for reporting a possible siting of this aquatic invasive plant can be found at www.niipp.net.

Cleaning and Removing

- ✓ All equipment surfaces exposed to water should be cleaned and dried, especially if the equipment has been left for more than a day on water infested with zebra or quagga mussels.
- ✓ Special attention should be given to cleaning and drying boats before moving between water bodies.
- ✓ Mud, plants, and animals should be removed from boats, propellers, trailers, and accessory equipment whenever boats are launched or retrieved. Anchors and anchor ropes, downrigger cables, fishing tackle, and scuba gear can harbor invasive species. All mud, plants, and animals must be removed before leaving the marina (625 ILCS 45/5-23).
- ✓ Invasive species should be discarded in trash cans (17 IAC 870.30) located away from the water to prevent re-entry.
- ✓ The bilge, live well, and other water containing devices should be drained before leaving the marina.
- ✓ Equipment should be left to dry for at least five days or wiped with a towel before reuse.
- ✓ Equipment that has been left in the water for more than a day or has been exposed to a known infested body of water should be cleaned using additional decontamination methods:
  - Spray hull and other external areas or recreational equipment with high pressure, hot water. Water temperature should be as hot as possible.

- Flush motors according to owner's manual with hot water.
- Rinse interior compartments with hot water.
- Use 100 percent vinegar or a 3 1/2 percent salt water solution if hot water is unavailable. Sanitizing solutions of bleach should be avoided because they may be harmful to beneficial organisms.

✓ Unused bait, worms, and fish parts should be disposed of in proper collection receptacles. Unused bait should never be dumped into the water.

Best Management Practices for Creating Habitats

Enhance Habitats

✓ Add rocks to the shoreline to create new areas for feeding and spawning.

✓ Choose plants that bear flowers, fruit, nuts, and seeds to attract birds, small mammals, and other wildlife.

✓ Maintain proper soil pH and fertility levels. These two measures together tell you which plants your soil can support.

✓ Adjust soil pH by adding lime (base) or gypsum (acid), if needed.

✓ Add organic matter such as compost, leaf mold, manure, grass clippings, bark, or peat moss to improve soil fertility. Be careful to not deposit organic matter into any water body.

✓ Submit a soil sample to your University of Illinois county extension office or soil conservation district office periodically to determine fertility, pH, and application rates for soil amendments. Visit www.aiswcd.org/Guide/swcd.htm to find your soil conservation district and web.extension.illinois.edu/state/findoffice.html for information about extension offices.

✓ Foster beneficial organisms such as pillbugs, which aerate the soil and improve the flow of water and air to plant roots.

✓ Compost leaves, branches, grass trimmings, and other organic matter. Use the mature compost to nourish your soil.

✓ Chip branches and leaves and use them as mulch to

discourage weeds and conserve moisture.

- ✓ Consider using captive beaches between rock headlands to protect shorelines and provide beach habitat for shorebirds, waterfowl, and turtles.
- ✓ Add spawning-sized rocks at the toe of breakwalls to enhance fish-spawning habitat. Consult the IDNR Division of Fisheries for the proper rock size for desired fish species in your area.
- ✓ Create or allow development of wetland vegetation along the outside perimeter of the marina or in shallow-water areas. Wetland vegetation provides habitat for fish and wildlife and helps reduce erosion and shoreline damage from storms and wave action.

References

United States Environmental Protection Agency. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. Washington, DC: EPA-841-B-01-005.